

REMARKS

Applicants thank the Examiner for the consideration given the present application. Claims 1-9 and 14-57 are pending. Claims 15-24, 33-39, 50, 52, 54 and 56 are presently amended. Claims 11-13 have been cancelled herein and Claim 10 was cancelled previously. No new Claims have been added.

Specifically, Claims 15-24, 33-39, 50, 52, 54 and 56 have been amended to include the language “when compared to conventionally processed coffee beans.” Support for these amendments is found in Examples 1-3 and throughout the Specification. Additionally, Claims 15, 20, 33, 50, 52, 54 and 56 have been further mended to include the modifying term “treated” before the product designation, such as, for example, coffee beans. Support for these amendments is found in table in Example 1 and throughout the Specification.

The Objection to Claims 11-13

The Examiner has objected to Claims 11-13 because they all ultimately depend from cancelled Claim 10. In a sincere effort to advance the prosecution of this case, Applicants have herein cancelled Claims 11-13 to correct any ambiguity related thereto. As such, Applicants respectfully submit the Examiner’s rejection has been overcome.

The Rejection under 35 U.S.C. § 112, second paragraph

Claims 15-24, 33-39 and 50-57 have been rejected under 35 U.S.C. § 112, second paragraph for allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Specifically, the Examiner indicates that the term “reduced,” is not clearly defined in the present claims.

As aforementioned, the Examiner rejects Claims 15-24, 33-39 and 50-57 for the use of the term “reduced” therein. Specifically, the Examiner states that “reduced” is a relative term which renders the claim indefinite because it is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.” The Examiner continues to say “[a] product, as it stands in its current state, cannot simply be “reduced,” without reference to a standard or to the previous condition.”

While Applicants respectfully disagree with the Examiner's characterization of the use of the term "reduced" herein, in a sincere effort to advance prosecution of the present application, Applicants have herein amended Claims 15-24, 33-39 and 50-57 to further define the meaning of the term "reduced." For instance, Applicants have added the language shown in italics such that the Claim 15 now reads as follows: *[t]reated coffee beans, wherein the level of asparagine in said coffee beans is reduced by at least about 10% when compared to conventionally processed coffee beans.* See Claim 15, amended herein. Applicants respectfully assert that the present amendments to Claims 15-24, 33-39 and 50-57 particularly point out and distinctly claim the subject matter of the invention and, therefore, overcome the rejection of these claims under §112, second paragraph.

The Provisional Obviousness-type Double Patenting Rejection

Claims 1-9 and 11-57 remain provisionally rejected under the judicially created doctrine of obviousness-type double patenting. Specifically, Claims 50-57 have been provisionally rejected as being unpatentable over Claims 13-14 of co-pending Application No. 10/603,978, and Claims 1-9 and 11-57 have been provisionally rejected as being unpatentable over the claims of co-pending Application No. 10/606,137. In a sincere effort to advance the prosecution of this case, included with this response is a Terminal Disclaimer, disclaiming the terminal part of the statutory term of any patent granted on the above-identified application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. §154 to §156 and §173 as presently shortened by any terminal disclaimer of co-pending Application Nos. 10/603,978 and/or 10/606,137. Accordingly, it is respectfully requested that the obviousness-type double patenting rejections be withdrawn.

Synopsis of the Invention

Applicants have discovered that asparagine, a naturally occurring amino acid found in virtually all living systems, can form acrylamide when heated. Thus, materials richer in asparagine, when heated, tend to contain higher levels of acrylamide; this is especially the case when asparagine-containing materials are heated in the presence of reducing sugars.

While not being limited by theory, it is believed that the alpha-amine group of free asparagine reacts with a carbonyl source, forming a Schiff base. Under heat, the Schiff base adduct decarboxylates, forming a product that can either: (1) hydrolyze to form beta-alanine amide (which can, under heat, further degrade to form acrylamide) or (2) decompose to form acrylamide and the corresponding imine. (Applicants have discovered that the circled precursor atoms comprise the carbons and nitrogens in acrylamide.)

Accordingly, Applicants have further discovered that acrylamide formation in roasted coffee beans can be reduced by removing the asparagine or converting the asparagine in the coffee beans to another substance before final roasting of the beans. When such beans containing reduced levels of asparagine undergo final roasting, the amount of acrylamide formed is reduced.

Applicants have found that adding an enzyme that hydrolyzes the amide group on the side chain of asparagine prior to final roasting of the coffee beans reduces the level of acrylamide present in the roasted coffee beans. While not being limited by theory, it is believed that the addition of such an enzyme degrades the side chain of asparagine, thus preventing the asparagine from forming acrylamide. In doing so, the amide bond is hydrolyzed and asparagine is converted to aspartic acid.

The Rejection under 35 U.S.C. § 103

The Examiner has rejected Claims 1-9 and 11-57 under 35 U.S.C. § 103 as being unpatentable over Elder et al., Pub. No. 2004/0058054 (herein “Elder”). Specifically, the Examiner reasserts the arguments of the previous Office Action, which generally state that Elder teaches the reduction of acrylamide in coffee.

The Examiner bears the burden of factually supporting any *prima facie* conclusion of obviousness. In determining the differences between the cited art and the claims, the question is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. See Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530 (Fe. Cir. 1983). Distilling the invention down to the “gist” or “thrust” of an invention disregards the requirement of analyzing the subject matter “as a whole.” See W.L. Gore & Assoc., Inc. v. Garlock, Inc., 721 F.2d 1540 (Fed. Cir. 1983).

Inventors of unobvious compositions, such as those of the present invention, enjoy a *presumption* of non-obviousness, which must then be overcome by the Examiner establishing a case of *prima facie* obviousness by the appropriate standard. If the Examiner does not prove a *prima facie* case of unpatentability, then without more, the Applicant is entitled to grant of the patent. *See In re Oetiker*, 977 F.2d 1443.

To establish a *prima facie* case of obviousness under 35 U.S.C. §103, the Examiner must meet three basic criteria. First, there must be some suggestion or motivation, either in the reference itself, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the cited reference must teach or suggest *all* the claim limitations. See, for example, *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). Appellants again respectfully assert that the Office Action fails to establish any of these criteria, and thus, fails to make a *prima facie* case of obviousness under 35 U.S.C. § 103.

First, there is no suggestion or motivation to modify the reference. Elder very generally discusses the reduction of acrylamide by using the term “inactivating asparagine.” However, this broad claim, without more, does not provide the motivation necessary to make obvious the specific methods and compositions disclosed presently for actually reducing acrylamide in coffee and coffee beans. While Elder’s disclosure includes coffee and coffee beans among a long list of examples of foods which contain acrylamide, at no time does Elder specifically teach how to reduce acrylamide in coffee or coffee beans. Indeed, Elder does not even claim reduction of acrylamide in coffee beans, choosing instead to focus on rice, wheat, corn, barley and other like carbohydrates.

In sharp contrast to the ambiguous teachings of Elder, the present invention is clearly defined and supported in the Specification, which not only provides a specific analytical method useful for reducing acrylamide in food products, but also provides numerous examples illustrating the use of that method to reduce acrylamide in a variety of coffee products and coffee beans. Thus, while Elder can show, by way of a single example, only that the level of acrylamide may be reduced in a laboratory setting, apart from any food product, and in particular, any coffee product, the present Applicants have provided specific instances of acrylamide reduction in coffee and coffee beans.

Due to the lack of support for the theories presented therein, Applicants continue to respectfully assert that there is no suggestion or motivation to modify Elder such that

the present invention is obvious in view thereof. For this reason alone, Applicants respectfully assert that a *prima facie* case of obviousness has not been established.

Second, there is no reasonable expectation of success as Elder fails to teach a method for acrylamide reduction in coffee beans. As aforementioned, Elder generally discusses “inactivating asparagine” in foods, yet fails to provide any practical teachings relating thereto, even though the claims are directed to food products. The Examiner relies on paragraph [0011] of Elder to allegedly teach the reduction of acrylamide by contacting asparagine with asparaginase to decompose the asparagine into aspartic acid ammonia. However, Applicants respectfully assert that the complex nature of food products, and in particular, coffee and coffee beans, does not permit Elder to speculate that such a reaction would necessarily occur in an actual food product simply because it occurred in a test tube. For this reason alone, Applicants respectfully assert that there is no likelihood of success and, therefore, a *prima facie* case of obviousness has not been established.

Moreover, there is no likelihood that the disclosure of Elder could provide a reduction in the level of asparagine in a food product (and particularly coffee beans) by, for example, at least about 10%, at least about 30%, etc., up to at least about 90%, as presently taught and claimed by Applicants. See, for example, Examples 1-3. Similarly, there is no teaching or suggestion in Elder of roasted coffee beans that have acrylamide levels below about 160 ppb, below about 150 ppb, etc. down to a level below about 10 ppb, as presently taught and claimed by Applicants. This is in contrast to conventionally processed coffee beans which may have around 400 ppb acrylamide. See, for example, Example 2. Rather, the Elder examples test only a chemical reaction (or the inhibition thereof) of a few chemicals independent of any food product. Specifically, Example 5 in Elder deals only with the combination of asparagine, glucose and asparaginase in a laboratory setting. (Notably this is the only example having anything to do with *preventing* acrylamide formation.) There is no showing that such an example is in any way representative of what would occur if the method disclosed therein was carried out using an actual food product. Without such a correlation, it cannot be said that Elder teaches the likelihood of success of Applicants independent claims. As a result, it cannot be said that Elder provides *any* likelihood that the findings presented therein could be

produced in food products, and in particular, in coffee and coffee beans. Therefore, Applicants respectfully assert that because Elder merely sets forth very general teachings around acrylamide reduction, it provides no reasonable expectation of success of providing coffee beans or coffee products have reduced acrylamide levels. For this additional reason, Applicants respectfully assert that a *prima facie* case of obviousness has not been established.

Finally, there is no teaching of all the claim limitations. The Examiner states the "Applicants is correct in stating that the reference does not specifically teach, or provide an example of, reducing the level of asparagine/acrylamide in coffee or coffee beans." See pg. 6 of Office Action dated 1/12/05. However, the Examiner excuses this lack of teaching by stating that Elder discloses using an asparaginase enzyme to reduce acrylamide. Again, Applicants respectfully assert that this does not amount to teaching the present invention, which describes a specific method to reduce acrylamide in coffee and coffee products. The fact that Elder mentions coffee beans among a list of food products that contain acrylamide hardly amounts to teaching a method for reducing the level of asparagine or acrylamide therein. Therefore, for this reason alone, Applicants respectfully assert that Elder fails to teach all the limitations of the present claims and fails to establish a *prima facie* case of obviousness.

Moreover, as discussed above, the Examiner has pointed to no teaching in Elder that suggests the specific claim limitations concerning the level of asparagine or acrylamide reduction, or the resulting level of acrylamide, in coffee beans that are included in many of Applicants' claims. Clearly, Elder cannot be said to render obvious such claims, particularly in view of the very limited disclosure around how one reduces such levels of acrylamide. For this additional reason, Applicants respectfully assert that there is no teaching of all of the present claim limitations.

Findings of fact relied upon in making the obviousness rejection must be supported by substantial evidence within the record. See *In re Gartside*, 203 F.3d 1305, 1315 (Fed. Cir. 2000). Applicants respectfully assert that, for all of the above reasons, the Examiner has failed to support the obviousness rejection with substantial evidence, and thus, has failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103. Therefore, Applicants respectfully request the rejection under 35 U.S.C. §103 be withdrawn.

CONCLUSION

In view of the foregoing, it is respectfully submitted that the Examiner's objections and rejections under 35 U.S.C. §§ 112 and 103, as well as the provisional double patenting rejection, have all been overcome. Withdrawal of these rejections is respectfully requested.

Respectfully submitted,

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